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REMARKS

The Official Action dated December 5, 2005 has been received and its contents carefully noted. In view thereof, claims 11 and 15 have been amended in order to better define that which Applicant regards as the invention. As previously, claims 11 through 16 are presently pending in the instant Application.

With reference now the Official Action and particularly page 2 thereof, claims 11 through 14 have been rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,151,770 issued to Inoue. This rejection is respectfully traversed in that the patent to Inoue neither discloses nor suggests that which is presently set forth by Applicant's claimed invention.

As can be seen from the foregoing amendments, each of independent claims 1 and 15 have been amended to recite an RF device. Particularly, independent claim 11 recites an RF device comprising a plurality of semiconductor elements formed on a semiconductor substrate, and a plurality of through holes which are provided between two adjacent ones of the plurality of semiconductor elements and pass from a surface through the backside of the semiconductor substrate, wherein a distance between two adjacent ones of the plurality of through holes is smaller than a thickness of the semiconductor substrate. Particularly, independent claim 11 clearly recites that a distance between the two adjacent through holes is smaller than the thickness of the semiconductor substrate. In doing so, the isolation between the two adjacent semiconductor elements having a through hole therebetween with respect to the radio frequency signal, can be improved, especially when the $g/d < 1$ is satisfied as noted from FIG. 2. The relationship of the distance between the two adjacent through holes and the thickness of the semiconductor substrate is particularly important in accordance with Applicant's claimed invention.

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As can be noted from FIG. 2, the ordinate axis represents dB, and as is clearly illustrated therein, the less the g/d ratio is, the less the dB is, thereby the isolation between the adjacent semiconductor elements is exponentially improved. This is clearly not the case with the teachings of Inoue.

In reviewing the teachings of Inoue, it is noted that Inoue discloses a semiconductor device in which the insulating film comprising SiON and having a thickness of 500 nm is formed over the two semiconductor elements provided on the semiconductor substrate. The plurality of via holes are disposed in the orthogonal direction with respect to the substrate between the two semiconductor elements in the insulating film and the distance between the adjacent via holes is 100 nm and the via holes are subsequently filled with a metal. Furthermore, Inoue discloses the structure that the via holes are formed to be disposed between the two semiconductor elements in each of the multi-layered insulating film and the semiconductor substrate, are connected to each other through the conductive film that is formed between the layers, and the via holes are filled with a metal and are grounded for high frequencies. However, Inoue fails to disclose or remotely suggest the particular relationship between the distance between two adjacent through holes and the thickness of the semiconductor substrate as is specifically recited by Applicant's claimed invention.

In addition to the foregoing, it is noted that Inoue disclosed that the insulating film comprising SiON is formed on a semiconductor substrate and that the via holes are provided in the insulating film in the orthogonal direction to the substrate thereby separating the two semiconductor elements at higher frequency. On the other hand, Inoue also discloses that, when the insulating film in which the via holes are formed is thick, the insulating film having a multi-layered structure is formed and the via holes are formed in each insulating film. That is, Inoue clearly considers the via holes formed in the insulating films to be more important

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than those in the semiconductor substrate in order to separate the two semiconductor elements at high frequencies by way of the via holes. However, as discussed in detail in Applicant's remarks filed September 23, 2005, even when the insulating film is formed on the semiconductor substrate, high frequency, which transmits between the two semiconductor elements, transmits within the semiconductor substrate. Therefore, even when the insulating film is formed on the semiconductor substrate, it is important to provide the via holes in the semiconductor substrate itself and control the distance of the via holes. Thus, the teachings of Inoue are directly contrary to that of the present invention. Consequently, it is respectfully submitted that Applicant's claimed invention as set forth in independent claim 11 as well as those claims which depend therefrom is not rendered obvious in view of the teachings of Inoue and is in proper condition for allowance.

It is noted that the Examiner appreciates that Inoue does not expressly disclose a distance between two adjacent ones of the plurality of through holes to be smaller than a thickness of the semiconductor substrate, however, Examiner states that it would have been obvious to one of ordinary skill in the art at the time of the invention to make the thickness of the substrate greater than 100 microns to have a solid support for the semiconductor device. However, the Examiner fails to provide any support for such suggestion. Moreover, as noted hereinabove, since Inoue teaches a device contrary to that set forth in accordance with Applicant's claimed invention, the structure of the present invention, the distance between the two adjacent through holes being smaller than the thickness of the semiconductor substrate, would not have been apparent to one of ordinary skill in the art nor would such structure be brought to light by the teachings of Inoue. Further, as noted above, the present invention results in what can be considered an unexpected effect that the isolation between the adjacent semiconductor elements when the $g/d < 1$ is satisfied, is dramatically improved.

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Accordingly, it is respectfully submitted that Applicant's claimed invention as set forth in independent claim 11 as well as those claims which depend therefrom, is neither disclosed in nor remotely suggested by the teachings of Inoue and is in proper condition for allowance.

With reference now to page 3 of the Office Action, claims 15 and 16 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue as applied to claims 11 through 14 and further in view of U.S. Patent No. 6,229,209 issued to Nakamura, et al. This rejection is respectfully traversed in that the patent to Nakamura et al. does nothing to overcome the Applicant's shortcomings associated with Inoue.

In this regard, it is noted that Nakamura et al. merely discloses that side faces of through holes may be covered with a conductive material. However, this reference clearly fails to disclose or remotely suggest that the isolation between the adjacent semiconductor elements is improved by shortening the distance between the adjacent through holes. Accordingly, it is respectfully submitted that Applicant's claimed invention as set forth in independent claim 15 as well as claim 16 which depends therefrom clearly distinguishes over the combination proposed by the Examiner and are in proper condition for allowance.

Therefore, in view of the foregoing, it is respectfully requested that the rejections of record be reconsidered and withdrawn by the Examiner, claims 11 through 16 be allowed and that the Application be passed to issue.

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Should the Examiner believe a further conference would be of benefit in expediting the prosecution of the instant application, he is hereby invited to telephone counsel to arrange such a conference.

Respectfully submitted,



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